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THE VETERINARY JOURNAL

A Monthly Review of Veterinary Science.

Editor:
FREDERICK HOBDAY, F.R.C.V.S., F.R.S.E.,
HONORARY VETERINARY SURGEON TO HIS MAJESTY THE KING.
MAJOR IN THE ARMY VETERINARY CORPS.
HONORARY MEMBER OF THE AMERICAN VETERINARY MEDICAL ASSOCIATION.
CORRESPONDANT ÉTRANGER DE LA SOCIÉTÉ DE MÉDECINE VÉTÉRINAIRE DU BRABANT (BELGIUM).

Sub-Editor:
GLADSTONE MAYALL, M.R.C.V.S.

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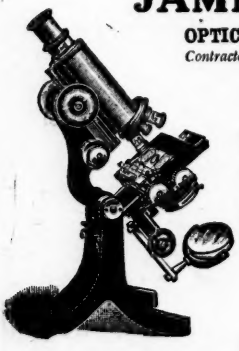

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Sub-Editor :

GLADSTONE MAYALL M.R.C.V.S.

JANUARY, 1918.

Editorials.

ENERGY AND PRODUCTION.

THERE are many calls on all sides for the putting forth of effort in connection with the War. The greatest call of all is for a display of energy in matters of production. There is great need, too, to look at works that create necessities in the right perspective. Control has its place in well-ordered operations that enable the vast majority to live, but to make a fetish of control and to neglect energetic and enthusiastic measures to increase the supply of all commodities is like making a race of schoolmasters without paying any attention to the production of the boys and girls that form the school. At present we think there is far too much talk about control and far too little thought and energy devoted to the production of controllable things. Facts like the scarcity and lack of foodstuffs and of farm and back-yard animals are accepted with a foolish fatalism that considers them as irremovable and irremediable.

Then, again, it seems evident that there is far more would-be energy anxious to distribute food than to produce it. It may be that the food producer does not advertise his activities as much as the distributor, but after a number of years' experience of men and their ways, we have always found those who want the finished article to be greatly in excess of those who want to set about giving time, thought, and effort to the gradual production of the animal or thing desired and wanted. Men want milch cattle ready-made to milk them; they don't want to bother about rearing calves. They want pork and bacon, but not to keep pigs; they need fowls, potatoes, cabbages, and fruit ready for cooking and eating; but the effort needed to produce them is a job for the other fellow. "Back to the land" is a basic and fundamental cry for the country and nation

that desires to really live. The range of food products is inclined to be too narrow. Recently the Editor called attention to the value of horse flesh as food. It was a wise thought. More might be done with regard to goat flesh, venison, pigeons, wild birds, tame rabbits, frogs and fresh water fish. Co-operative effort needs extending in these directions, and a closer union forming between rural districts and man-made towns and cities.

Veterinary surgeons should do all that lies in their power to encourage the breeding of small animals useful as food. The man who loves to dabble in the nursing and bringing up of young animal and vegetable life even on a small scale is worthy of encouragement, support, and praise. The support in a well-ordered State ought to be practical, scientific, and plentiful. A well-known statesman recently said that the allotment holder chiefly saved us from famine in 1917. There are about 1,000,000 allotments in England and Wales at the present time. There would not be too many if the number was doubled or trebled. On all hands the cry is for brains and effort, and still more brains and effort. In many circles at present the position seems to be that described in the Lancashire saying : " Hello ! has tha pulled thi coat off to make folk think that tha'rt working ? " The head wants to work with the hands. G. M.

SAVING ANIMAL LIFE.

THE veterinary surgeon's mission is to preserve animal life and not to destroy it. At the present time it is equally important to conserve the flocks and herds at home as to save as many as may be of the animals on campaign. It is a credit to the Army Veterinary Service that there has as yet been no great outbreak of serious contagious disease. The plagues that have hitherto followed in the wake of great armies are conspicuous by their absence. Rinderpest, anæmia, foot and mouth disease, up to date seem all to have succumbed to efficient and painstaking veterinary measures. It is estimated that about 4½ million horses and mules are being employed by the various nations at war, and in this vast assembly there seems to be very little serious contagious and infectious disease.

We have always thought that the veterinarian who succeeds in bringing his horses and mules in good health to the scene of warlike operations is deserving of special praise and commendation. Good hygiene, which prevents exposure to heat, cold and wet, clean and roomy quarters, avoidance of over fatigue, cars and stalls with sufficient air space, all involve an amount of care and anxiety on the part of the veterinarian which puts a much greater strain on him than if he was engaged in the equally important duty of seeing that

the anmals were sound and healthy when bought. The saving of horse life in the missile-swept zones may possibly be furthered by paying more attention to the gentle art of camouflage. This is one of the up-to-date moves of the War. "Camouflage" has been existent among us for many a long year, but it has only just been prominently recognised. There is commercial, professional, dress, writing, statistical, and oratorical camouflage, and it seems as though it might be possible to make the colour of horses harmonise with the ground or to make them appear what they are not in reality.

If the preservation of animal life is well organised and well carried out in the combatant areas the same is quite as important in the areas from which supply is derived. It will not do for us to sit down and say "Everything is for the best in the best of all possible worlds, and with folded hands we'll watch developments." Cattle, sheep, pigs and goats are being reduced in number. Do we know nothing of the operations necessary to renew the supply? The times are difficult, but difficulties exist to be overcome, and the Britisher has in the past had a good record in the surmounting of them. The responsibilities of veterinary surgeons remaining in civil life are increased rather than lessened as regards the preservation of animal life. We must give to the service of the live-stock industry the best that is in us. The man who now sees to it that two food animals grow and thrive where one grew and thrived before is a supreme patriot who is helping to establish the nation on a rock.

G. M.

Original Communications.

DISTOMATOSIS, LIVER-ROT OR FLUKE IN SHEEP AND CATTLE.

By EDWARD MORGAN, M.R.C.V.S., D.V.H.,
Puerto Cabello, Venezuela.

Also, locally, is known better by other terms: Pwd and Cwalo (Wales); Coathe (Dorsetshire, Devon); Iles (Cornwall); Bane (Somersetshire); Cachexie aqueuse (France).

A few years ago Professor Dewar called attention to the fact that ethereal extract of male shield-fern had been used with success in France in the treatment of the above disease in sheep. Up to that time treatment in the way of medicine was considered of little value for destroying or getting rid of the parasites from the liver.

The following month of January I had an opportunity amongst our own flock of testing such efficiency of the drug.

Subjects.—Two Welsh mountain rams, four years old. These

animals showed symptoms of being badly affected with the parasites:—Emaciated, and so weak that sometimes when they would get in amongst the heather, they had to be assisted out. Impaired appetite; the visible mucous membranes were pallid, and with a tinge of yellow; œdematous eyelids. The wool could easily be separated from the pelt. Abdomen pendulous and distended. Thirst. Prominent œdematous swelling between the rami of the lower jaws, which farmers in some districts term as "chockered" and "watery poke," and which they considered as the spot of all the evil. (They incise it, then squeeze the contents, and afterwards plug it with some special variety of herbs, and at the same time decorate the sheep with a collar round the neck made of fine twigs of mountain ash.) These two sheep voided fluke eggs with the fæces. They passed most of their time grazing on ditches and damp areas where the grass is soft and evergreen.

Treatment.—I placed these two sheep in the stackyard, where they could take corn, hay, and swedes *ad lib.* Each received daily 2 drachms of ethereal extract of male shield-fern, mixed in an ounce of linseed oil. This medicine was continued with for one week, *i.e.*, once a day. They had two more doses about the end of the second week. They stayed in the stackyard for about six weeks, until one day they felt strong enough to jump the fence and join the rest of the flock; and later in the spring they left the fields once again and took to their old haunts on the highest peaks of the hill.

In August of the same year we killed one of the two, which was in good, fat condition. I examined the liver, but found no flukes, but cirrhosis of the organ, and thickening of the walls of the bile-ducts.

Having seen that this one was free of flukes, we then decided to keep the other sheep. In the autumn he was placed in some fields with about sixty ewes, all of which in the spring dropped strong, healthy lambs. Again the next season he was allowed to run with the same number of ewes in the same fields, but unfortunately one or two of these ewes, which were bought in September, died during the winter months. Evidently they were "coathed"—*i.e.*, had flukes in the liver at the time of sale, as several ewes from the same flock died elsewhere.

The following summer, after we had already seen that these ewes were infected, and that the ram had been in contact with them and had been on the contaminated pasture throughout the winter and spring, we thought that the best way this time was not to spare the knife, as the ram was in good condition. On examination of the liver, I found it indurated with extensive proliferation of the connective tissue, and there were a few flukes present, as anticipated, but not so numerous

as I have witnessed in apparently healthy sheep which have been slaughtered elsewhere at different abattoirs. I should account for the presence of these flukes by the contamination of the pasture by the before-mentioned ewes, and that this ram if allowed to run its course for another season, would most probably succumb. Also, if it had been killed the previous summer, I would have found the liver free of flukes.

Judging, then, by the favourable results of the above two cases, ethereal extract of male shield-fern, if used early, before the grave symptoms appear, should give good results, as the above two cases were in the last stages of the disease when treatment was commenced, but being rams they could withstand it longer than ewes. That is my experience.

When treating such cases it is most essential to allow the sheep plenty of nutrient dry food and place them on pasture free of ditches and "sheep-rot weed," or else they will be continually dawdling around such places and nibbling the soft, green grass, which nature never provided for sheep, but for aquatic and semi-aquatic birds, and such areas are the homes of the fresh-water snails and the heaven of wild ducks, snipe, woodcock, etc., which devour snails and embryonic flukes such as the encysted cercaria which are attached to this grass.

It is remarkable that even the presence of a large number of liver flukes does not ordinarily cause any disturbance in the nutrition of cattle. I have noticed that sometimes only a small area of the liver is unaffected, and yet the cattle which have been slaughtered were in good nutrient condition. Often the carcases are as good as any in the abattoir. We know that flukes are far more prevalent in sheep than in cattle in Great Britain, owing, to a certain extent, to the cattle being stall-fed in winter, and if there are any flukes in their livers they void many of them during the winter, and are not re-infected, and many of the eggs are unable to go through the usual life cycle, being probably destroyed unless the manure is carted away soon to damp pasture; but in most districts the manure is carted to arable land. In the case of sheep they are on the pasture all the year round, and once infested with flukes, are often re-infected by the embryos from the eggs which they have discharged on the land; as it only takes about three weeks after the encysted cercaria is swallowed before the fluke is fully mature in the liver.

Apart from the medicinal treatment, is there such an occurrence as spontaneous recovery—getting rid of flukes from the liver? In the case of cattle I believe it often happens so.

At the Frigonfico of Venezuela, in the spring months of the year, on an average between 50 and 100 per cent. of the livers of cattle

contain flukes in great numbers as well as gall stones; the presence of the latter are due to a certain extent to the presence of the flukes. Last year a herd of bullocks about six years old were slaughtered one day in the abattoir at Puerto Cabello. All the livers contained flukes in abundance, so much so that the bile ducts were distended like varicose veins, and most of them contained calcareous deposits and gall stones in the bile ducts and gall bladders. Two bullocks of this same lot of cattle were not fit to be slaughtered, being emaciated. I ordered them to be sent to some pasture adjoining the sea, where salt percolates through the soil on to the surface, the land being almost of sea level. These two bullocks made a quick recovery out there, and were slaughtered about three months ago, being in fat condition, for beef purposes. They remained on this land for about eight months. On *post-mortem* examination I found the livers free of flukes. One liver was enlarged and yellowish in colour—fatty infiltration—and indurated round the borders. The other liver had an area of induration at the inferior third of the posterior surface, and the presence of dark, pitted areas—cavernous blood spaces—on the surface, which extended into the liver substance. These are only two out of many such cases which I have witnessed. We meet these fluky livers in the spring months of the year, in the majority of cases. Many of these bullocks which they are unable to slaughter in the spring are kept on until the autumn, and bullocks from the same herd of cattle and from the same pasture, which were killed in the spring, were infected with flukes, and the rest, which were kept on until the autumn, were found free of flukes at the time of slaughtering.

I think our knowledge of this parasite is not yet what one would desire. There might be certain months of the year when there is a certain stage in the life cycle of the parasite or its intermediate host which is yet unknown. The parasite might be less vigorous during certain months of the year. Why is it that in the tropics of Venezuela the parasites are so prevalent in the livers during the spring months of the year, and during the other months rarely a fluke is seen? We might think that in temperate zones the difference of temperature between summer and winter would account for such occurrence, but here the temperature is about the same throughout the year, therefore there must be some other cause for their absence at certain months of the year.

Given a suitable ground, such as moisture, etc., these parasites are most prolific, as almost everything seems to be in their favour for multiplying. Being hermaphrodite, one parasite is sufficient in a short time to contaminate an extensive area of land. Distomes are pure entozoa. They cannot live in the adult condition outside the body

of their definite host. Their embryonic stages are passed partly in smaller host animals of the group of molluscs, mostly water snails of the genus limnœa. Cases have been recorded in Great Britain in the horse, man and pig, but they are most prevalent in sheep and cattle in most countries. In Hungary, Servia and Russia pigs are frequently infested with flukes. There is a fluke called " Gastrodiscus hominis " (bed-pan fluke) found in man, which is not uncommon in Assam ; it is an intestinal fluke.

In Asia Minor there is a pharyngeal invasion by flukes, said to be due to eating raw goat's liver.

In China there is a fluke which is normally parasitic of pig. In various parts of that country it commonly occurs in man, with gastro-intestinal symptoms. Also in India—Burma.

A trematode called "Distomum sineuse" is an endemic in Japan and causes severe hepatitis.

Life History of Distomum Hepaticum.

The ovarian cell segments and goes through certain stages—morula, blastula, and gastrula—and finally reaches a larval form, miracidium, which is an oval body, with a gut and two unicellular glands on either side, opening into the gut. The surface is ciliated. It possesses nerve gangline, eye spots, flame cells, and excretory tubule. Also it possesses a number of masses of cells which are loose in the body cavity called " germ balls ;" possibly these are derived from the original ovum. The miracidium gets out of the cell into the water, and swims about. It enters the soft parts of a snail and now changes to form a sporocyst.

The sporocyst is a relatively fusiform tube lined with epithelium. All the organs disappear and there remains an irregular body (which may be the remains of the eye spots). The cavity is almost filled with germ balls, or germ massses. These germ masses give rise to next stage. It also posseses pigmented eye spots.

Inside the sporocyst form the germ balls develop the rediæ. The rediæ are elongated in shape. They have a pharynx, and a gut lined with epithelium ; on the surface are ridges and a birth pore. The rediæ burst out the sporocyst and get to the liver of the snail. They are about 2 mm. in length, Inside is filled with germ balls.

Inside the redia develop the circaria—*i.e.*, a young fluke in all details with a tail and cutaneous glands, maybe other slight differences. They escape from the redia by the birth pore, and then finally out of the snail into water, and swim about by means of the tail. Eventually they drop their tail and encyst. The cyst being formed by the cutaneous glands, encystment takes place on the grass.

When a sheep or bovine animal devours the cyst, the wall gets dissolved in the stomach and the young fluke goes to the liver. There may be some other complications, as they may be devoured by fish, toads, etc.

It will be seen that from one fertilised egg either several cercariæ are formed, each capsule of which becomes an adult trematode, or that the process of sexual reproduction may be repeated, and from one fertilised egg many rediæ are formed, and from each redia many cercariæ. Each cercaria may become an adult sexually mature trematode.

Mode of Preservation of Flukes.

Fill one third (⅓) of a test-tube with salt solution. Place the flukes in this solution; skake well for about 2 minutes; the object is to stretch the flukes.

Add an equal volume of saturated watery sublimate (10 per cent.) quickly before the fluke has contracted after first shaking. Shake again for five minutes. Place the test-tube flat and let it remain so for twenty-four hours. Transfer next day to 70 per cent. alcohol, and leave in this permanently.

For large flukes it is generally necessary to exercise some pressure as they are somewhat muscular. Compress by placing a glass plate over them and place between two slides and cover the whole with fixative such as sublimate or formalin or alcohol.

Examination and Staining of Flukes.

Unstained—

1. Dehydrate in alcohol gradually.
2. Clear in cedar wood oil or creosote. (Oil of cloves and Xylol not used because they harden the fluke.)

Stained—

1. Bring the flukes from fixative into water, and wash off the fixative.
2. Stain in acetic carmin (1 in 40) over night.
3. Wash in water to remove the alum in the stain (15 minutes).
4. Differentiate by means of acid alcohol (alcohol 70 per cent.) 100. HCL (hydrochloric acid) 5 drops. Leave in acid alcohol for about twelve hours.
5. Pass through alcohol and clear with cedar wood oil and mount in balsam.

It is best with all these stains to use dilute solutions for a long time nstead of strong solutions for a short time. Dilute hæmatoxylin can be used instead of acetic alum carmine, but the latter gives the best esults.

PROPHYLAXIS.

Good land-drainage. Surface dressing of salt. Avoid when possible keeping sheep on the same pasture both summer and winter. Avoid flat marshes, unless they are salt marshes.

Allow the sheep a liberal quantity of salt, as they require it, like horses and cattle.

Sheep should be carefully examined periodically, and if one has the least suspicion of fluke disease, they should be removed to dry pasture, or preferably salt marshes, and treat them with extractum Filicis liquidum—

> " That dire distemper sometimes may the swain,
> Though late, discern ; when on the lifted lid
> Or visual orb the turgid veins are pale ;
> The swelling liver, then her putrid store
> Begins to feel. Even yet thy skill exert,
> Nor suffer weak despair to fold thy arms
> Again detersive salt apply, or shed
> The hoary medicine o'er their acid food."
>
> —*Dyers Fleece Book I.*

From a jurisprudence point of view, this is an important disease, and much concerns the veterinary surgeon. Cases are on record where the vendor has been sued for damages where a guarantee had been given that the sheep were free from disease at the time of sale. It is a delicate question to settle whether they were " coathed " (rotted) before the sale, or not. Sheep will sometimes show symptoms very soon if the land is very badly infested. As at present, when the prices of sheep are so high, it is only natural that the buyer expects to get sound sheep after paying heavy prices for them.

DIPHTHERITIC VAGINITIS OF CATTLE.

By C. A. POWELL, M.R.C.V.S.,
The Sand House, Woburn.

In country practice one occasionally comes across a form of vaginitis, following parturition in cattle, about which, on reference to text-books, one either fails to find any mention or the information afforded is of a very meagre character.

Moussu and Dollar's " Diseases of Cattle," etc., give a fairly good description of it under the heading of Croupal Vaginitis, but the prognosis and treatment are very discouraging. Before, however, alluding to the latter I do not think I can do better than quote them in full.

" Croupal Vaginitis is a form of acute vaginitis, from which it is distinguished by the formation of false membranes, resembling those of diphtheria, over the whole of the vaginal mucous membrane.

"It was described by Baumeister. Moussu had only seen one case, and that at a period which rendered recovery out of the question.

"*Symptoms.*—The external symptoms are those of acute vaginitis, with a greyish, fetid, purulent or sanguinolent discharge. On examination the mucous membrane is found to be covered with yellowish-greyish false membranes, and with vegetations of a greyish, dirty, verrucous appearance. The entire extent of the vaginal mucous membrane may be attacked, together with the neck of the uterus. In Moussu's case the uterus itself was entirely invaded. These false membranes and vegetations are very adherent, and bleed freely at the slightest touch. They are apt to extend by degrees. The cause of this infection has not yet been determined. It appears to obtain access to the parts during parturition and develops insidiously for a week or two, when widespread lesions have already formed.

"The *diagnosis* is extremely easy.

"The *prognosis* is grave, for the lesions have a tendency to extend towards neighbouring organs; moreover the general health is severely affected, there is rapid wasting and continued fever, and death occurs from exhaustion, intoxication, and, possibly, infection.

"*Treatment.*—The treatment suggested for the ordinary acute forms appears to be useless in this condition. The new membranes show too many folds, depressions, and accidental cul-de-sacs for simple injections to have any real effect. Better results might be expected from packing with antiseptic gauze or from the use of antiseptic ointments applied after washing out the cavity with permanganate of potash solution or hydroxyl.

"Curettage followed by the use of gauze dressings might also be tried; considerable difficulty must necessarily be anticipated in operating in a cavity which has become inextensible, and partly filled with vegetations and false membranes."

Now for my own experiences. For some years I had occasionally met with cases of this disease which gave me no end of trouble—were protracted, and invariably ended in being slaughtered as incurable, or death occurring as the result of pelvic or general peritonitis.

Nothing in the way of any remedies, either local or general, seemed to stay its progress in the least. Everything I could think or read of was tried, even the at one time much-vaunted chinosol in very strong solutions, but without avail, and it was not until the following, which I now describe, did I obtain a recovery.

A short horn heifer—been calved about a week—membranes retained, movement very stiff, fever, loss of appetite, back arched and constant straining, membranes very much decomposed, vulva swollen, and discharging a thin, sanious, foul-smelling material.

The membranes were fairly easily removed, after which examination showed the vaginal walls to be covered with dirty grey membranes of a leathery character, in parts penetrating deeply into crevices in the mucous lining down into the deeper structures, which were tumefied and swollen. Portions of the diphtheritic membrane could only be detached with difficulty, as it was intimately adherent to the mucous lining. When detached the surface of the latter presented a raw, angry-looking appearance, covered with fine, granular-looking projections on which the false membrane rapidly re-formed.

It gave a roughened feel to the touch, and passing one's hand in as far as the os, one could find deep fissures, especially in the region surrounding the os. The discharge from this was of a sour, fetid odour, acrid in character, staining and roughening the skin of the hand.

Recognising that I had a case of diphtheritic vaginitis to deal with, that the case was worth nothing to kill, and, reasoning from previous experience, it was a practically hopeless one, I decided on severe and drastic measures. I first irrigated the uterus thoroughly with a fairly hot solution of krisophen. I then made a swab of tow, soaked it in a saturated solution of hydrarg. perchlor. in methylated spirit, and applied thoroughly as a swab to the whole of the vaginal surface. I then packed each cul-de-sac with pledgets of double cyanide gauze soaked in the same solution. Tonics in the shape of iron, quinine, and Ol. Tereb. were prescribed, and the case left.

On my next visit, two days later, I found the animal improved. I removed the pledgets of gauze and found the false membranes had begun to slough, leaving a healthy granulating surface beneath. This time I irrigated the uterus, the os of which had become very constricted, with a 1 in 2,000 solution of hyd. perchlor. and again swabbed the diphtheritic surface as before, packing again with gauze soaked in a weaker solution.

On my next visit I found progress maintained—appetite returning and improvement manifest. I again removed pledgets, but did not repack, irrigated uterus, and swabbed any suspicious place on the vaginal wall with the strong solution. I found scarcely any fresh growth of false membrane, and the cul-de-sacs were showing a tendency to fill up. I left hyd. perchlor. to make a 1 in 1,000 solution, to be injected into the vaginal cavity with an ordinary clyster syringe with a short nozzle daily, and continued internal treatment as before. I continued personal attention every two or three days, and in a fortnight the case had quite recovered, and the last I saw of the animal—some months afterwards—she was ready for the butcher; in fact, I should not have known her had not the owner pointed her out.

Since then I have treated several cases in the same manner with good

results. In one case, not having any perchloride with me, I used the ordinary Liq. Zinci Chlor. diluted to half its strength with water, and applied with a swab thoroughly to the diseased surface. In this case, however, which was in its early stages, I did not leave any tampons *in situ*, as this agent when so applied tends to penetrate too deeply. I followed this up with daily irrigations of a 1 in 1,000 hyd. perchlor. solution, together with internal administration of tonics. Recovery was very rapid in this case.

For irrigating the uterus, I use an ordinary Winton's enema pump with rubber tube, to the end of which is affixed an ordinary human œsophageal tube, which I find is introduced easily into the os, the lumen of which is often constricted to the size of one's little finger, and with less risk of penetrating the debilitated and inflamed uterine wall. The injections, swabbing and plugging cause severe straining, which, however, does no harm, and soon passes off, and in 24 hours improvement is manifest. I have had some very bad advanced cases where the animal has been a complete wreck, getting up with difficulty, recover completely ; and where the case is met with where the disease is in the early stage, and the mucous membrane only partially invaded, recovery is complete in a few days. Very bad cases take about a fortnight, and even after a healthy condition of the uterus and vaginal walls has been established, recovery of condition is necessarily a long time. In these cases tonics such as iron, quinine, and nux vomica may be given for a week or two with advantage.

The membrane formed very much simulates that met with in the so-called diphtheria of young calves, where one gets a diphtheritic sloughing of the buccal, pharyngeal, and lingual mucous membrane extending into the deeper structures.

Detaching the necrosed portions and swabbing with the before mentioned solutions—either zinc or hydrarg—daily as necessary gives very good results, but it must be done thoroughly by the veterinary surgeon in attendance ; leaving it to the herdsman, in my experience, does not give satisfactory results.

Iodine with Pot. Iodid. in small doses may be given internally with benefit. Daily attention to the mouth is absolutely necessary, and the removal of masticated masses of hay, which are sure to accumulate.

A DELAYED FRACTURE OF THE HUMERUS.

By WM. LOTHIAN, M.R.C.V.S.,
Duns, Berwickshire.

The subject of this notice was a middle-aged chestnut cob, which had the distinction of having done his bit in France, and was going at grass with a work horse. Three days previous to my seeing him

he had been kicked on the near arm, just about the middle of the flexor brachii muscle. There was little swelling, and the wound was not large. He stood on the leg ; it seemed to carry a fair share of the weight, but he had difficulty in flexing the forearm and extending the leg. Thus I thought was due to injury of the muscle. Warm, antiseptic fomentations were applied.

Ten days later I was asked to see him again, as improvement was slight. However, the day previous he had been removed to a loose box, had laid down, and seemed considerably better ; he walked out of stable and back again to loose box. Next day I was sent for again, and found the leg pendulous, and the humerus fractured. He was destroyed and a *P.M.* examination made, when the bone was found to be fractured into four large and four small pieces. This was fourteen days after he received the kick.

I did not suspect fracture, but this case suggests the necessity of taking the same precautionary measures in kicks on the humerus as we do in those of the tibia.

RADIAL PARALYSIS IN THE COW.

THE below somewhat rare condition in cattle, showing the dropped elbow, occurred in the practice of Mr. H. L. Roberts, of Ipswich. The young cow had a bad attack of milk fever. During the night

PHOTO OF A COW WITH RADIAL PARALYSIS.

she recovered consciousness and attempted to rise, but slipped on the bricks in so doing. The condition indicated was then noticed. The photograph was taken by Mr. Reginald Holmes, student at the Royal Veterinary College, London.

ALOPECIA.

By G. MAYALL, M.R.C.V.S.

ALOPECIA is said to be due to disturbance of the nutrition of the skin. An examination of skin scrapings under the microscope will distinguish it from acariasis. It is not contagious, and there is apparently no organic or parasitic disease of the skin. It is stated that it may arise from influences which injuriously affect the trophic nerves. Some authors believe that it occurs chiefly in spring after copious sweating and gastric disturbances. In the human subject food or medicine is given which stimulates the nutrition of the nerves, as fat, phosphates, crushed wheat or fish.

The complaint chiefly affects horses, cattle, and dogs. In the last named I have seen it chiefly in Poms, and occasionally in Yorkshire and Aberdeen terriors.

In a cart-horse in a large stud that I attend I have one subject that regularly suffers at the fall of the year. I have noticed it now on five annual occasions. The place most regularly attacked is the hollow of the near flank. Little spots arise, which widen and coalesce, there is a fair amount of dry scale, and eventually an oval bare patch arises about a foot and a half long and a foot wide. Application of carbolised oil or lead and potash oils soon brings about complete recovery, and during nine months of the year the horse appears to have a perfect coat of hair. Occasionally one side of the neck suffers in the same way. The subject is always on the lean side and of nervous temperament and bad to shoe behind; but he is a good worker and never has suffered from any general disease. The proper name for the affection is, I believe, *alopecia areata*. I have only seen one case of *alopecia symptomatica*, and that was when accompanying Capt. Guy Sutton, F.R.C.V.S., on his rounds some years ago. In this case the horse was absolutely bare all over and looked like an equine in elephantine disguise.

In Poms I have effected improvement by dressing the skin with melted coconut oil and the internal administration of iron and arsenious iodide. I do not believe that poor food is a contributing cause, because I have seen it in both men and animals where the feeding was first-class. The horse patient mentioned herein is very liberally fed. For years and years this affection has been known, but the cause of it seems still to be hidden in some mist of obscurity.

A NOTE ON JHOOLING IN CAMELS*.

By H. E. CROSS, M.R.C.V.S., D.V.H., A.Sc.,
Camel Specialist, Sohawa.

JHOOLING, or Jhoolak as the disease is sometimes called, is a contagious disease of camels, manifesting itself in the formation of local tumours, hot and painful, of a fibrous character and terminating in suppuration and raw patches.

Distribution.—The disease is widely distributed throughout the Punjab ; it is not so common in the Lahore District as in the Jhelum

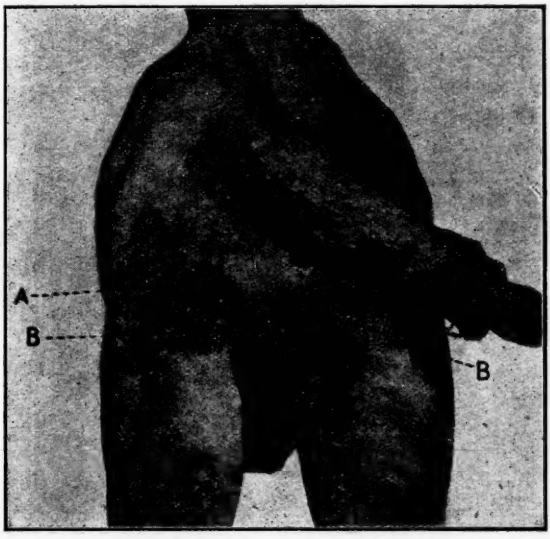

Fig. 1.—Showing Raw Patch (A) and Swelling (B).

and Rawalpindi Districts. It usually occurs in the cold weather, but is met with occasionally in the hot weather.

Etiology.—The causal organism has not yet been isolated, though it is probably a fungus.

Pathogenicity.—Inoculation of emulsion of the lesion into horses, cattle, buffaloes, dogs, guinea-pigs, and rabbits does not produce the disease.

If portions of the lesion are rubbed on the skin, whether the skin be scarified or not, no jhooling lesion is produced in any of the above animals.

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* Bulletin No. 72, Agricultural Research Institute, Pusa.

Horses, buffaloes, and cattle kept in contact with camels suffering from jhooling do not contract the disease.

When portions of a jhooling lesion are rubbed on the scarified skin of healthy camels the disease develops after a few days. In only one case did the disease develop when a portion of a jhooling lesion was rubbed on the unscarified skin of healthy camels.

Healthy camels kept in contact with camels suffering from jhooling contract the disease rapidly.

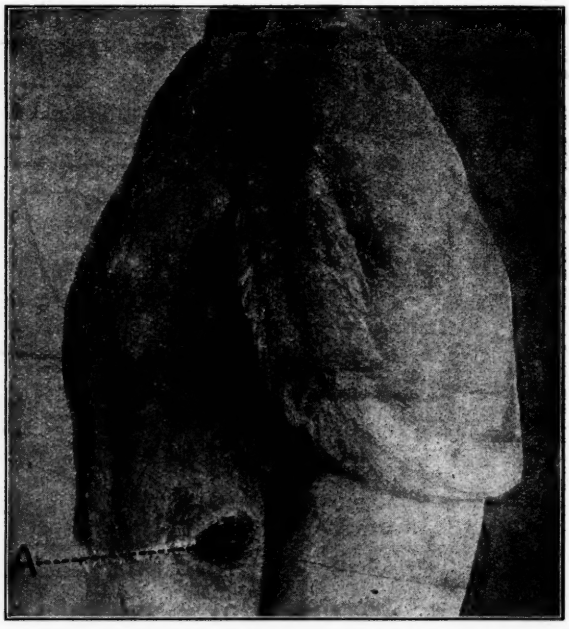

Fig. 2.—Showing Raw Patch (A).

Symptoms.—The first symptom is a hot, hard, and painful swelling varying from 1 to 5 inches in diameter, usually on the neck, hindquarters, or testicle, but the lesions may occur in almost every part of the body. After a few days the swelling becomes very irritating, and, if situated in any part of the body that the camel can reach with his teeth, he will gnaw at it, leaving a raw patch. In all cases after the lapse of some time suppuration takes place and finally the wound heals, leaving a small white patch which lasts for several months. As a rule several lesions are found on a camel suffering from the disease,

and the camel loses condition. The lesions take a long time to heal, and if situated in any part that comes in contact with the *palan* (saddle) the camel has to be put off work.

Anatomical changes.—The tumour consists of fibrous tissue, finally undergoing suppuration. Examination of the pus reveals streptococci; no staphylococci have been observed. In camels suffering from jhooling, on which I have made *post-mortems*, no lesions have been observed in the internal organs.

Treatment 1.—The best treatment, and one which gives very satisfactory results, is the following:—A strong red iodide of mercury blister should be applied, and after three days washed off with soap and water. The diseased areas should then be excised and finely powdered permanganate of potash applied. The permanganate of potash must be well rubbed in, and not simply dusted on. Three dressings at intervals of four days are usually sufficient.

Treatment 2.—Sometimes good results are obtained by excising the lesion and then applying pure phenyl or carbolic acid. The following day the wounds should be thoroughly washed with water and then treated with black wash (30 grains calomel, ½ ounce of glycerine, 1¼ ounces of tragacanth mucilage and lime water to make 10 ounces of lotion).

Camelmen apply boiling ghee to the lesions and "fire" round the edges of the lesions with the idea of preventing the lesion spreading. This treatment cannot, however, be considered satisfactory.

If the lesions are on the testicle, or in situations where they can be reached by the tail, the tail must be tied.

Prevention.—Camelmen are well aware of the contagious nature of this disease. If they have a camel suffering from jhooling lesions in the neck, this camel is always placed first in the string of camels; whereas if the lesions are on the hindquarters the camel is tied last.

Should a case of jhooling occur amongst a number of camels, it should be at once isolated from all the other camels. The remaining camels should be very carefully examined, and divided up into lots and not allowed to mix. Should more cases be found they should be at once isolated. The disease spreads very rapidly amongst camels and causes a great deal of trouble, so that every effort should be made to prevent the disease from spreading by careful examination and segregation. In camels suffering from jhooling, lesions in different stages are met with—healed up lesions, raw patches, and swellings.

No camel should be bought if small hard white spots are observed on the skin (they undoubtedly represent healed up jhooling lesions) without careful inspection for raw patches and swellings.

General Article.

HORSE FLESH AS HUMAN FOOD.*

By L. PRICE,
New York City.

Historical Outline.—The use of horseflesh as a human food is as early a custom as that of using the flesh of the other food producing animals. Archæologists have unearthed proof of its use by the caveman in northern Europe. That this custom was in progress long before the time of Moses is evident by the prohibitive clause in the Mosaic Law against the consumption of horsemeat. Hippocrates refers to its use and Herodotus describes it as an early custom that prevailed from the extreme East to the Ural Mountains. Later, Xenophon, Pliny, and Galen gave records of its use among the early Persians, Greeks, and Romans. The Saxon tribes that occupied northern Europe sacrificed the horse as the most noble animal to their gods Odin and Freya, and accompanied the ceremonies of the sacrifices with great feasts in which the eating of horseflesh was customary. It was in their zeal to spread Christianity and to remove all signs of pagan worship and sacrifice that Pope Gregory III and his successor, Zacharais I sent to St. Boniface, the Christian apostle in the Germanic countries, edicts prohibiting the use of horseflesh. These decrees were also issued to the people of Iceland, among whom hippophagy was so popular that it was only in the year 1000, three centuries later, that the people openly discontinued this custom.

The nomadic tribes of Tartars, Kirghis, and Kalmucks wandering about south-eastern Russia and its Asiatic possessions have used horsemeat for a long time, and were extremely fond of it. In Persia, asses were considered a delicacy, and throughout Asia the eating of horseflesh was customary. The Chinese had used horseflesh for ages, and, according to Ostertag, had even developed a special breed of "fat" horse, that was characterised by its delicate bone structure, fattening powers, and savory meat.

A few centuries ago, during the period of exploration and discovery, the following information appears in regard to the use of horseflesh:—

Phillips writes of the use of the flesh of horses, asses, and mules by the Moors in Tunis, Algiers, and also of the presence of a species of small horse that was raised solely for food purposes by negroes

*Presented at the meeting of the New York City Veterinary Medical Association, April, 1917, and reprinted from the *Journal of the American Veterinary Medical Association*,.

in Juida, Africa. In Marmol, Africa, wild horses were used for food by the natives. In South America, French and English explorers repeatedly mention the use of the flesh of wild and domestic horses for food purposes as a custom in the various countries. Sir Francis B. Head stated that the Pampas ate the flesh of mares, which they never rode. Delvaille refers to the natives of Bolivia as preferring horsemeat, and others state that hippophagy was in vogue in Chili and among the Patagonians.

During the French Revolution, the Parisians used horseflesh constantly for six months without bad results. To what extent and whether the custom of eating horsemeat was popular or prevalent among the people of the European countries prior to the beginning of the nineteenth century cannot be determined but it appears that, later its sale and use was gradually permitted by the various governments as a necessary or progressive measure. Thus in 1807, in Denmark, when the Danes were under siege, this measure was officially adopted. Larrey, the famous surgeon to the armies of Napoleon, used horsemeat to feed the sick and convalescent soldiers in the various campaigns, and mentions its use in combating a scurvy epidemic. In 1840 Munich and in 1855 Germany permitted the sale and use of horseflesh. Vienna sanctioned its public sale in 1854. In France, Decroix, St. Hilaire and others had publicly advocated the use of horsemeat for many years and finally succeeded in influencing the Government to authorise its sale and use on July 9th, 1866. Horsemeat is now publicly sold in the other European countries with various degrees of popularity.

Use in Europe and United States.—In 1899 a regulation was passed in Great Britain permitting the sale of horsemeat. No statistics of the extent of the use of horsemeat in Great Britain were available. There lately appeared the following in the *London Meat Trade Journal*: "Shops for the sale of horseflesh are being introduced into every large town. The high price of beef, mutton and pork is giving horseflesh an opportunity to acquire favour, and if the present cost of living continues after the war, horseflesh may become a permanent article of food." (Quoted from the *Butchers' Advocate.*)

In France the use of horsemeat has been marked by an increasing public demand, as may be seen from the following statistical data. These are incomplete and probably underestimated. Ostertag states that two-thirds of the horsemeat is manufactured into sausages and also that more than 100,000 of the 600,000 families in Paris use horsemeat. In 1910 twenty-nine million pounds of horsemeat was produced for consumption in Paris and its environs.

NUMBER OF HORSES, ASSES AND MULES SLAUGHTERED IN PARIS—1866–1910 (Gathered from various sources).

	Total.	Horses.	Asses.	Mules.
1866 (from July 9)	902	—	—	—
1867	2,125	2,069	59	24
1868	2,405	2,297	97	11
1870–71	65,000	64,362	635	3
1872	5,732	5,034	675	23
1875	6,865	6,448	394	23
1878	11,319	10,800	438	31
1888	13,475	—	—	—
1898	21,476	—	—	—
1900	25,059	—	—	—
1902	31,342	—	—	—
1904	44,279	—	—	—
1906	58,856	—	—	—
1910	60,338	57,734	822	223

There are two horse abattoirs under municipal control which supply Paris. The retail establishments handling horsemeat rapidly increased in number from the date of authorisation of its sale. In 1874 there were 48; in 1889, 132; in 1894, 212; and in 1906, 299. (Moreau 9.)

NUMBER OF HORSES SLAUGHTERED IN GERMANY—(Ostertag) 10.

In Prussia ..	1890–91 ..	53,281	horses.
	1893–94 ..	58,306	,,
	1899 ..	63,801	,,

According to the twenty-eighth annual report of the Bureau of Animal Industry,* Germany, in 1909, slaughtered 152,214 horses, which provided 79,000,000 lb. of meat; approximately 1½ lb. per capita. (There were also 6,990 dogs slaughtered for food purposes.)

NUMBER OF HORSES SLAUGHTERED IN MUNICIPAL ABATTOIRS IN CERTAIN CITIES (15).

12,890	horses	slaughtered	at	Municipal	Abattoir	in Berlin.
18,290	,,	,,	,,	,,	,,	Vienna, 1892.
7,132	,,	,,	,,	,,	,,	Milan, Italy, 1907.
1,375	,,	,,	,,	,,	,,	Liége, Belgium, 1906.

COMPARISON OF NUMBER OF ANIMALS SLAUGHTERED AND AVERAGE PER CAPITA CONSUMPTION OF MEAT IN BELGIUM 1905–1909 (2).

Horses slaughtered	38,200	Horsemeat consumed per capita ..	1·51 kgm.
Cattle ,,	438,900	Beef consumed per capita	17·54 ,,
Calves ,,	350,500	Veal consumed per capita	3·03 ,,
Lambs and sheep slaughtered	352,400	Lamb and mutton consumed per capita	0·74 ,,

At the Municipal Abattoir, in Odessa, Russia, out of a yearly slaughter of 150,000 food animals, about 300 horses are slaughtered during the winter months for use by the Tartars.

Probably the first mention of the use of horseflesh in the United States was made in 1898, when in the Appropriation of that year for the Bureau of Animal Industry provision was made "That live horses and the carcasses and the products thereof be entitled to the same inspection as other animals, carcasses and products thereof."

*(Statistique Agricole Annuelle—Dept. of Seine 28, B.A.I. Annual Report).

Most of the horsemeat produced was prepared for export trade, as may be seen from figures below, though probably some of it was also for domestic consumption. In fact, it seems that this regulation was enacted solely for the purpose of encouraging exportation, as the following letter by Vice-Consul Blom appears, in the Consular Report of April, 1900: "Several years ago I called the attention of Danish dealers in horsemeat to the American supply. I have now to report that the business is increasing rapidly, and the meat from the United States gives satisfaction. The consumption of horsemeat in Denmark is comparatively large, and Copenhagen is a distributing port for Sweden, Norway, Finland, Russia, and the German Baltic."

HORSES EXPORTED FROM THE UNITED STATES, 1900-1903 (1).

Year.	No. packages inspected horsemeat.	No. certificates issued.	Packages Exported.	Weight.
1900	602	8	472	188,800 lb.
1901	821	9	880	249,900 ,,
1902	638	11	638	170,986 ,,
1903	70	1 shipment	70	28,000 ,,

Description.—The dressed carcass of the horse is characterised by its dark colour, the absence of any extensive fat deposits, and the peculiar yellow colouring of the fat. It may be readily recognised by the length of the neck, number of ribs, the non-lobulated kidney, and the many distinguishing bony structures, etc., though there may be considerable variation in the different breeds and types. There is lack of subcutaneous fat that makes the removal of the hide extremely difficult, and the fat deposits in the region of the kidney and the flank are relatively meagre, even in well nourished animals. In such animals the tendency is for the fat to be of a lighter shade, and there usually is a rather thick layer on the median line and lower abdominal wall; there is also a peculiar fat deposit of firm consistency on the neck (sometimes called "comb-fat") which differs from the usual yellow soft horse fat. The mesenteric fat has a darker yellow colour and is scantily deposited.

Horsemeat has a deep, dark, red colour, bordering almost on brown or black, and a bluish sheen appears on exposure to the air. On section, the fascia is very prominent, and the absence of intermuscular fat and the lack of the marbling quality is very noticeable. Leach describes horseflesh as having a coarser texture, and short muscle fibres, as a rule; Edelman describes the fibres as very fine; Huidekoper refers to the flesh of asses and mules as having a finer grain than that of the horse.

The bone-marrow is soft, greasy, and waxlike, of a yellow colour, and stiffens when exposed to the air. The offal of the horse, ass or mule, like the offal from the other food-producing animals, may be grouped into edible, inedible, and therapeutic by-products.

COMPOSITION OF HORSEMEAT (WILEY) (13).

Water	69·81
Water in fat-free substance	76·91
Fat	9·61
Protein	19·47
Protein insoluble in water	14·83
Gelatinous protein	1·23
Meat bases	1·70
Glycogen	1·82
Ash	1·01

WATER PROTEIN AND FATS IN COMMON MEATS—(Rubner)* (12).

	Water.	Protein.	Fat.		Water.	Protein.	Fat.
Lean beef	76·3	20·5	1·8	Fat beef	71·0	19·9	7·7
Lean veal	78·8	19·8	0·8	Fat veal	72·3	18·9	7·4
Lean pork	72·6	19·9	6·8	Fat pork	47·4	14·5	37·3
Lean poultry	76·2	19·7	1·4	Fat poultry	70·0	8·5	9·3
Very lean mutton	76·0	18·1	5·8	Very fat mutton	47·9	19·8	36·3
Horsemeat	72·3	21·7	2·5	Horsemeat	72·3	21·7	2·5

In 100 parts of meat free from fat the following amount of dry substance was found (Rubner, 12) :—

Beef	21–22
Veal	20–21
Pork	21–23
Mutton	21
Horse	23–25

*NOTE.—In the edition of Rubner (Lehrbuch der Hygiene) consulted, evidently composition for fat beef was given for lean beef, as numbers given above were in transposed order.

In the chemical analysis of the muscles of the various animals, there are minor differences that bring out the distinguishing properties of the various meats. While horseflesh does not materially differ to any great extent from the flesh of other animals, some of its individual characteristics are : the relatively large proportion of glycogen, the presence of certain extractives, and the peculiar qualities of horse fat.

Glycogen, or animal starch, is normally found in the muscles and in the liver, where it is stored up for future distribution in the body. Its physiological function is to aid in the metabolic production of muscular energy and animal fat, and its presence is not marked by a constant quantity in all the muscles of the body. An herbivorous diet that is rich is carbohydrates may be a probable factor in an increased glycogen content in the muscles of horses. Glycogen is present in greater quantities in well-nourished horses, while it may be slight or totally lacking in overworked and under-fed animals. Lobster and liver are other foods containing a relatively high percentage of glycogen, and are high in public favour.

Leach states that taurin is present in the flesh of the horse. Taurin is an organic compound that originates from proteids and belongs to that class of nitrogenous waste products or extractives in which creatine, creatinine, xanthine, hypo-xanthine, etc., belong.

These latter named compounds are commonly found in variable proportions in the muscles of all animals.

A special characteristic of horse fat is its high content of olein. Horsefat has also a very low melting point, a characteristic crystallisation form, a higher heat value, and a greater iodine number, etc.

Meat Inspection.—Horses are usually slaughtered in abattoirs operated exclusively for this purpose. To conduct a careful and thorough ante-mortem examination, a well constructed stable, with sufficient space and stable room, is necessary. The importance of the ante-mortem examination may be emphasised for the following reasons: The majority of the horses that would be presented at the abattoir would naturally not be in a perfectly sound condition, and it is of great importance to recognise the condition that sends each animal to the slaughter-house, and to ascertain if this condition affects its acceptability. The ante-mortem examination would also eliminate certain conditions of diseases that may not be marked by visible pathological lesions, and yet render the flesh dangerous or unwholesome. Finally, it would serve as an effective control of glanders, the early discovery of which is so important that every possible precaution to eliminate its presence in a food product is justified. A diagnostic mallein inoculation test supplemented by a suitable laboratory serological test should be the routine procedure.

The necessity for a suitable stable under the complete control of the public health authorities is further emphasised in order to ensure a proper and effective quarantine, and prevent any temptation on the part of those interested to foil, or interfere with, the natural course and outcome of the test.

RESULTS OF ANTE MORTEM INSPECTION OF HORSES (B.A.I 1899–1903) (1).

Year.	Horses Inspected.	Rejected—subjected to post-mortem exam. at abattoir.	Post-mortem inspection.	Carcasses condemned at abattoir.	Died at abattoir.
1899	3,232	27	2,232	181	43
1900	5,560	66	5,559	112	29
1901	1,991	3	1,992	103	27
1902	1,649	0	1,649	25	48
1903	3,344	0	344	11	0

The *post-mortem* examination of the horse should be carried out in a similar manner to that practised in the examination of cattle. A more detailed and careful inspection is carried on in examination of the head, which is split open so as to expose the mucous membranes of the nasal cavity, the turbinated bones, and the sinuses. A careful inspection is made of the mucous membranes of the larynx, pharynx, and trachea. Examination should also be made of the kidney, serous membrances lining the body cavities, the articulations, withers, skin, etc.

The pathological conditions met within the slaughtering of horses may be conveniently grouped as follows :—

1. Conditions that are not likely to be dangerous to man, and not affecting the wholesomeness of the food ; this group would include those which were rendered useless for domestic service as a result of acute or chronic injury acquired through accident, overwork or misuse ; also certain conditions, affecting sight, hearing, or ability to partake of food, thus handicapping or limiting the usefulness of the animal. Also conditions about the limbs involving the bony structure, tendons, and articulations. Perhaps also certain vices, lowering the working capacity of the horse. Parasites of the horse may also be included in this group. According to Ostertag, parasites found in the body of food animals may be grouped as follows :—" Parasites which are not transmissible to man ; parasites which may be transmitted to man by eating meat ; parasites which are not immediately harmful, but which may become so after a preliminary change of host." Under the last mentioned group, *Echinococcus polymorphus* may be considered, and as " they are more frequent in cattle than horses, they require no special reference." The parasites that may be transmissible to man by eating meat are not commonly known to occur in the flesh of the horse. Parasites found in the body of the horse under ordinary circumstances are not of special importance in considering meat inspection.

CONDITIONS CAUSING CONDEMNATION OF HORSES ON POST-MORTEM EXAMINATION (B.A.I. 1900–1903) (1).

	1900.	1901.	1902.	1903.
Tuberculosis	1	—	—	—
Abscesses	1	6	1	—
Pneumonia	6	3	—	1
Pleurisy	1	1	—	4
Carditis	1	—	—	—
Enteritis	1	3	1	—
Peritonitis	3	1	1	—
Metritis	1	3	—	1
Septicemia	12	17	12	2
Pyemia	5	4	1	1
Anæmia—Emaciation or Marasmus	37	11	3	—
High Temperature	2	—	1	—
Recent Parturition	2	—	—	—
Downers	29	4	—	—
Dead	29	27	48	—
Melanosis	1	2	4	—
Paraphymosis	1	0	—	—
Fistula	6	1	—	—
Open Joint	2	—	—	—
Gangrene	—	1	—	—
Pregnancy	—	40	—	—
Lymphangitis	—	2	—	—
Pharyngitis	—	1	—	—
Nasal discharge	—	2	—	—
Distemper	—	2	—	—
Jaundice	—	—	1	—

2. Conditions and diseases of horses which may affect the wholesomeness of the flesh or prove dangerous to man. These embrace extreme age, emaciation, suppurative conditions, diseases of unknown etiology, toxemias, etc.

3. This group includes dangerous infectious diseases of the Equidæ that may prove dangerous to man. For example, such as glanders, tetanus, less frequently rabies, tuberculosis, etc.

Opposition to horseflesh as a food.—The earliest and most effective opposition to the use of horseflesh is that in the Mosaic Law. The papal decrees of the seventh and eighth centuries stopping the custom of sacrificing horses and horseflesh that existed among the Germanic tribes and the people of Iceland have already been referred to. Probably to these religious restrictions is due the prejudice that grew against horseflesh, and exists even to the present day.

Considerable opposition is also due to the sentimental feeling for an animal as domesticated as the horse. Any such sentimental feeling must be regarded as inconsistent in view of the fact that other completely domesticated animals are slaughtered for food purposes. Indeed, it would be an act of mercy well earned by many a faithful horse, that has lost his early vigour, to be sent to the abattoir, rather than to allow him to fall into the hands of some huckster or cruel driver to be underfed and overworked to a gradual death.

Horsemeat is conceded to be a wholesome and nutritious food by eminent authorities in this country and abroad.

The use of horseflesh for human food should also be considered from the standpoint of public welfare and as an improving economic measure. It offers an economical, acceptable flesh food, especially for the workers who are unable to afford the luxury of the present high-priced meats, and still find it desirable or necessary to have meat as part of their daily diet.

It seems, indeed, unreasonable that so much valuable food should be wasted in the face of the privations that exist among the poorer population in the larger cities. Here the foreign element have, in the majority of cases, been initiated to the eating of horseflesh in their native land, and would gladly accept this product in view of its proportionately lower price.

The opposition to horsemeat on the grounds of its physical characteristics is unjustified. The taste of manufactured products or culinary preparations may be so disguised as to make recognition difficult or impossible. Certain preparations of horsemeat are relished and preferred by those who have not allowed prejudice to get the better of personal taste. A slight sweetness of taste is

considered one of the qualities of horsemeat, while toughness is not necessarily characteristic of horsemeat any more than it is of any other meat, but depends rather upon the age, sex, and condition of the particular animal which it has been derived from.

Ostertag refers to Pflüger as mentioning that when horsemeat is used exclusively it is apt to cause diarrhœa, which is directly due to a substance present in horseflesh that is soluble in alcohol and passes over into the meat broth when horsemeat is cooked. This material consists of 75 per cent. leeithin and 25 per cent. of neutral fat and cholesterin. This injurious effect is in some manner avoided when the meat broth is poured off or when horsemeat is prepared together with beef or mutton tallow. Huidekoper states that horsemeat should always be broiled or roasted.

The following are the conclusions that were reached by the Italian Army Veterinarians Costa and Mori in regard to the use of refrigerated horsemeat: "Flesh of horses in normal physiological condition slaughtered under suitable rest, whether skinned or quartered and left in the skin, will keep perfectly well for two months, if subjected to a temperature between 1 and 4 degrees Centigrade, and an air moisture of 60 to 70 degrees." Meat cut in small pieces will not keep more than 25 to 30 days. Flesh from animals in normal but tired condition will not keep longer than 20 to 30 days, showing signs of decomposition in 15 days. The flesh in the skin, if withdrawn from the refrigerator every five days and left for 24 hours in ordinary temperature, keeps in good condition for 20 to 30 days; if carcasses, were skinned and quartered, preservation would be but 15 to 20 days. The liver does not keep more than eight to ten days, when it turns pitch black, becomes unsightly, and a few hours after removal from the cold cells decays, showing that this organ is the least resistant to chemical or bacterial change. The kidney keeps 20 days. Brain, if not removed from the skull, keeps two months; if removed, but one week at the longest. Loss in weight was from 8 per cent. to 10 per cent. in 30 days.

Refrigerated horseflesh after 15 days turns dark to black. The consistency remains normal for a long time. Chilled horseflesh becomes tender in 10 to 45 days; the outer surface appears brighter than fresh horsemeat. After ten days' storage in the cold room the meat cooks more rapidly than fresh meat and requires the same time as is necessary to cook unchilled beef of a two- to five-year old animal. The meat of tired animals was found not to cause any bad effects, but gave evidence of lack of taste."

Opposition to the use of the horse for food purposes as an individual cannot be upheld with any degree of consistency. Its

particular habits of cleanliness, together with the careful domestic attention that it receives, place the horse in this respect on a higher plane than the other domestic animals. In the selection of food, the fastidiousness of the horse has often been exaggerated, nevertheless it is conceded that the horse is more discriminating in the selection of food than the other domesticated animals. In comparison with poultry or swine discussion is unnecessary.

The method of procedure of the ante-mortem examination described previously should allay the fears of the public in regard to the possibility of unfit, worn out, or emaciated animals being slaughtered. This careful examination, followed by a careful *post-mortem* examination, should give further assurance that every possible measure is taken to produce a wholesome product. Indeed, comparison with the method of procedure and the findings in slaughtering aged, worn out and emaciated dairy cattle would perhaps place horseflesh in a better light.

Tuberculosis exists in dairy cows in very great proportions, and a considerable number are passed for food purposes in spite of having some tubercular lesions. After slaughter the poor condition of many dairy cows does not allow them to be presented to the public by way of the butcher shop in the usual cuts. Nevertheless, the consumer approves this product in the form of bolognas, canned meats, sausages, etc., with an ever increasing demand, after the original meat has been made acceptable by the addition of condiments and flavourings of various kinds. Tuberculosis among horses in this country may be considered a negative factor in comparison to its frequent occurrence in cattle and swine.

While there are no parasites present in horseflesh that are known to be transmissible to the human species, many may become affected with tapeworm by eating beef or pork containing the larval forms of the parasite; and trichinosis may be produced by the eating of pork.

Restrictions and Control.—Because horsemeat and its products will be placed upon the market as inferior products and cheaper in price, adulterations and substitutions in various manners may be attempted by the unscrupulous. The public would be entitled to protection for such reasons as well as in consideration for those who have a natural antipathy for horsemeat. Such protection may be promoted by regulations governing the slaughter and sale of horsemeat, rigid routine inspection and laboratory tests of material suspected of adulteration or substitutions.

Regulations governing the slaughter of horses usually restrict the process to abattoirs specially designed for this purpose. The

carcasses are stamped conspicuously or marked in some way in order to identify the nature of the meat. Selling horsemeat and its products is also limited to establishments that handle this product only, known signs, and the wrapping paper may also bear the information as to the nature of the article. Similar methods are used to control restaurants and factories handling horsemeat.

Rigid inspection should be exercised to detect unauthorised sale as well as any suspicion of adulteration or substitution, and legal prosecution should follow in all such cases.

Tests.—There are numerous laboratory tests that permit the detection of horsemeat, even when prepared in the form of sausages or other products. There are many different qualitative and quantitative tests for glycogen, which is present in larger quantities in horseflesh than it is in the flesh of the other food-producing animals. A glycogen test is more difficult to carry on in the presence of starch. Further possibilities of inaccuracy are likely when the sample is not fresh, as the glycogen in the flesh changes over very rapidly after slaughter to a reducing sugar which interferes with the procedure of the test.

GLYCOGEN CONTENT IN HORSEFLESH AND BEEF, ACCORDING TO AGE—(Ostertag) 10.

Species.	Age of Meat.	% of Glycogen.
Horse	3 hours	·700
,,	3 hours	1·026
,,	1 day	·373
,,	2 days	·603
,,	5 days	1·072
Beef	4 hours	·204
,,	½ hour	trace.
,,	2 days	·000
,,	5 days	·076

RELATIVE AMOUNTS OF GLYCOGEN—(Leach) 8.

	Water.	Glycogen direct. Niebel Method.	Glycogen direct. Maryhofer Method.	Glycogen in dry substance. Niebel.	Glycogen in dry substance. Maryhofer.
Horseflesh	74·44	0·440	0·445	1·721	1·741
,,	74·87	0·600	0·520	2·388	2·069
,,	76·17	1·827	1·727	7·667	7·247
Veal	74·16	—	0·086	—	0·342
Pork	75·00	—	0·186	—	0·744

Wiley states that a safer test for detection of horseflesh than by proving the presence of glycogen is in the examination of horse fat. The fat is not so susceptible to change and may be effectively detected even when in finely comminuted state or in mixture with other meats. Horse fat has a lower melting point, a higher iodine number, and a higher heat value when mixed with sulphuric acid.

Ostertag refers to Nussberger as finding it possible to determine horse fat by means of a Zeiss refractometer, which found horse fat to have a higher refractive index than that of beef fat.

Fat.	Iodine Value.	Butyro—Refractometer Readings Temp. 40°.
Horse	71·86	53·7
Beef	38·46	49·0
Pork	50·70	48·6 to 51·2.

Horsemeat may also be detected by means of a blood serum, usually prepared from a rabbit that has been sensitised by inoculations with blood serum of the horse or with juice from horsemeat. On contact of this prepared rabbit serum with the juice of horsemeat a reaction takes place.

Summary.—Horsemeat has been used as a food since ancient times to the present day in different parts of the world.

The opposition to the use of horseflesh is mainly an inherited prejudice arising from early religious restrictions. The opposition on the ground of its peculiar properties is justified. Horsemeat may be considered a wholesome, nutritious, and economical food.

Horsemeat should be sold under special regulations, to prevent adulteration and substitution.

Every possible precaution should be exercised to eliminate glanders in horses offered for food.

According to certain writers horsemeat should be prepared in a certain manner.

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Reviews.

DEPARTMENT OF AGRICULTURE—CANADA. REPORT OF THE VETERINARY DIRECTOR-GENERAL FOR THE YEAR ENDING MARCH 31st, 1916. Published by J. de Labroquerie Taché, Ottawa. Price 5 cents.

This report by F. Torrance, B.A., D.V.S., shows that good progress has been made against disease in the Dominion, although the

veterinary staff has been greatly depleted owing to the war. Owing to the great increase in the export of dressed meats the meat inspection division was kept very busy.

Glanders showed a considerable decrease, and out of a total of 241 horses killed the province of Saskatchewan contributed 191 cases. Eleven reactors were detected at the border in American horses, and were refused admittance to Canada. Saskatchewan, too, provided the greatest number of cases of mange in horses. A few outbreaks of anthrax occurred in Ontario and Quebec. The city of Saskatoon was put under the federal regulations as regards tuberculosis, and the tests were carried out without any friction; the results obtained were appreciated by the inhabitants of the city, and the Veterinary Director-General's Department was officially thanked. One hundred and sixty-four reactors were found.

The regulations provide for three methods of dealing with reactors: (1) Immediate slaughter; (2) slaughter after fattening; and (3) withdrawal from the raw milk trade. One hundred and fifty-three of the reactors were slaughtered, and ten owners withdrew their cows from the dairy business and had their licences cancelled. These ten cows were earmarked by punching out a large T in the right ear to indicate to would-be purchasers that they were tuberculous. The intradermal and subpalpebral tests were used in many cases, but they were on the whole neither so convenient nor reliable as the subcutaneous test. Five thousand three hundred and seventy-one cattle were tested by private practitioners, 366 of which reacted, and all reactors were permanently earmarked.

The immunising of hogs by the "serum alone" method reduced the losses from hog cholera very considerably. Formerly hogs exposed to infection were slaughtered; now those exposed to infection and not developing symptoms of the disease are immunised, fattened under quarantine regulations, and slaughtered under inspection for pork. The serum is injected by Government inspectors without cost to the pig owner. The benefit of the present procedure may be judged from the fact that 34,470 hogs were destroyed in 1915 as against 5,700 in 1916. The authorities in this country should note this. The deaths of several horses in Agassiz were attributed to eating bracken.

In the canned meat trade Canada could not supply the enormous demand of the British market, and large purchases of carcases were made from the States, but this supply was very carefully inspected and tinned, and shipped under special brands, so that it could not be shipped or sold as Canadian bacon, which has won a very good reputation in this country.

A larger proportion of whole carcases of hogs was condemned for tuberculosis than last year. One hundred and sixty-seven million pounds of bacon were exported, and 53,000,000 pounds of beef, which is not as good as Canada should do as compared with Demnark and Ireland.

The record of work done is a progressive one and reflects credit on all concerned. Canada understands and appreciates the necessity for producing good foodstuffs and increasing her supply. G. M.

SPECIAL EQUINE THERAPY. By Mart R. Steffen, V.S., M.D.C. V.M. Series, No. 14. Edited by D. M. Campbell. Published by the American Veterinary Publishing Co., Chicago.

This is a useful text-book, describing some infrequent and at times puzzling ailments of the horse and their treatment. It also gives helpful advice regarding some common and troublesome diseases that the general practitioner meets with. The book is divided into three parts, and in Part I the author's aim is to advise on the commercial aspect of the treatment of prolonged, unfavourable, and hopeful cases, and the wisdom of making fees elastic according to the result. He also has some good counsel on observation and the use of drugs, and the importance of avoiding excessive doses of medicaments, and a reasoned use of the same.

Part II deals with a number of baffling affections, such as tympany of the guttural pouch, myxoid degeneration of the facial bones, melanosis, osteoporosis, pseudo-hysteria of unsexed males, leuthemia, diabetes mellitus and insipidus, footrot in colts, transient crural paralysis, paralysis of the cauda equina, etc.

Part III is devoted to some common poisonings, among which carbolic acid, aconite, and arsenic are mentioned.

Some of the author's treatments and statements are open to controversy, but much sound and valuable advice may be gathered from his words, and the object of his efforts is wholly admirable.

In laminitis the removal of the shoes is not advocated, but rather condemned. The horn is to be rasped thin at the coronet and painted over with tincture of iodine (an ounce to each foot), and the patient is to be encouraged to lie down. Unfortunately this, in a number of cases, is what the patient obstinately refuses to do, or, if he does, then he just as persistently refuses to get up.

The use of stock cough mixtures is condemned. The cause of the cough and its variable sources are to be ascertained and remedies applied accordingly.

The mortality rate in purpura is given at 40 per cent. in well marked cases. Potassium dichromate in 3- to 6-grain doses is mentioned, and the use of bacterins is said to have a favourable effect on the course of the disease.

Tuberculosis is stated to be a very rare disease of horses, and the remark is made that it may easily be mistaken for glanders. We do not think so, and no mention is made of stiffness or pain of the cervical vertebra in these cases. We think, too, that the diazo reaction for testing the urine may be usefully employed in some suspected cases.

Influenza is presumed to be contagious, and the period of time during which infection is liable to be spread is given as ten days. The author is a strong advocate for the use of bacterins and the abscess knife in strangles. Tonic treatment is recommended, but no febrifuge treatment. The experience in this country with serum has not been universally acclaimed; the verdict on it where it has been extensively used in Army cases is an adverse one; but odd trials have been recorded where it has proved very useful. The thoughtful man will read this work with pleasure, and when by his judgment he has sifted a fine supply of intellectual and obvious wheat from some

light and airy chaff, he will be a stronger and more capable veterinarian. G. M.

VETERINARY OBSTETRICS.—By W. L. Williams, Professor of Obstetrics and Research Professor in the Diseases of Breeding Cattle in the New York State Veterinary College at Cornell University. Pp. xiv + 630, with three coloured plates and 140 illustrations in the text. Published by the author, Ithaca, N.Y., 1917. Price $5.

Those who know the keenness with which Professor Williams has entered into research in connection with contagious abortion will expect something good in this book, and they will not be disappointed. There are too few volumes containing a reasoned and practical survey of the field of obstetrics written by scientists with wide and plentiful technical experience. The text covers an extensive field, and only a broad review of its subject matter can be taken. The anatomy and physiology of the genital organs occupies a space of 131 pages, and a knowledge of them is necessary to an intelligent understanding of conception, pregnancy, the act of parturition, and the incidents connected with obstetric cases. The matter is interestingly, concisely, and lucidly written. The author denies that the penis of the bull can ever enter the cervical canal of the cow during copulation, and with regard to the mare states that " copulatory injuries from an unusually long penis occur in the vagina—not in the uterus."

The subjects of pregnancy and gestation are dealt with in forty-two pages, which include some very valuable information on the diagnosis of pregnancy. It seems possible by palpation of the uterus through the rectum to make an early diagnosis of pregnancy in cattle. This the author declares can be done almost immediately in the case of heifers by noting the hard, tense and smooth character of the uterus, and in cows the same condition may be noted in from forty to sixty days. As regards twin pregnancies, these are stated to be commonest in Holsteins and rarest in Jerseys. A short chapter on the Hygiene of Pregnant Animals is full of good advice and sound reasoning. Objection may, however, be taken to one point that the author seems to view with equanimity. We do not agree that pregnant animals of different spicees may be turned out together with any great amount of safety, and we think this is especially the case where the equine species are pastured or put in a straw yard with other pregnant domesticated animals. Especially does this apply to swine and mares. We have seen and heard of above one pregnant sow badly hit amidships by a playful and light-heeled mare.

The diseases of pregnancy and physiological parturition, including the care of the puerperal animal and care of the new-born, occupy a space of twenty-two pages. Rupture of the prepubian tendon is well described and illustrated and a very interesting and practical method of dealing with it is discussed. The value of treatment depends a good deal on the *entourage* of the patient, and the intelligence of the attendant in charge of the animal. The author advocates retaining the mare until the foal is weaned, keeping her as a brood mare or using her at moderate work.

Dystokia and the dealing with it occupies ninety-nine pages. Professor Williams gives some very wise advice to the obstetrist with

regard to the best instruments, their construction and form, to use in his work. He does not go so far as a well-known and experienced practitioner among cattle who said, "Give me a knife, a blunt hook, and some handy cords, and I will take any parturition case that comes," but he does condemn screwed and jointed instruments and those not easily cleansible, and he favours the oval ring as a handle for instruments—a statement with which most country practitioners will heartily agree.

There is one tip, about fastening a cord on the lower jaw of a fœtus, that is too good not to mention here. He says: "One of the most useful places for the attachment of cords is the inferior maxilla of the fœtus. . . . Some obstetrists have said that a cord could not be applied securely to the lower jaw of the fœtus, especially the foal." By making an incision between the rami of the jaw into the oral cavity, pushing the loop well back over the jaw, and putting the free end of the cord through the incision in the oral cavity outward, and then drawing the cord tight, any amount of traction can be employed. Embryotomy, gastro-hysterotomy, and hysterectomy are dealt with in this section.

Maternal and fœtal dystokia include emphysema of the fœtus, uterine inertia, hydrocephalus, wry neck in the foal, and interlocking of the maternal and fœtal pelves. These sections are particularly strong and comprehensive, and new views and clear-thinking make them eminently instructive and valuable. Wounds and injuries of the genital organs and puerperal infections and eclamptic diseases form the last sections of the work. The illustrations, printing, and general get-up of the book are first class.

The man in a busy country practice who has time to read should take this book on his knee in his spare moments and read it through and through. However good an obstetrist he may be, he will find fresh tips, live understanding, and very valuable information in this work. We think sometimes that an intelligent understanding of the state of affairs in a pregnant uterus is of more value to the obstetrist than a mere rough-and-ready overcoming of the difficulty presented. This book tells how to accomplish the task smoothly and effectively with the least injury to the patient and the greatest benefit to the new arrival. We wish the volume every success; it is a grand one. We look forward with pleasure to a book by the same author on "Diseases of the Genital Organs." We want some enlightenment on croupous and necrotic vulvitis and vaginitis in cattle, and hope we shall gain information thereon from him. G. M.

Personal.

NEW YEAR'S HONOURS.

To be Commander of the Order of the British Empire: Mr. F. W. GARNETT, J.P.,M.R.C.V.S., President of the Royal College of Veterinary Surgeons.

To be an Officer of the British Empire: Brevet-Major J. W. RAINEY, A.V.C.

To be a Member of the Order of the British Empire : Mr. HERBERT MASON, Veterinary Service, Cairo.

THE profession will learn with regret of the following recent casualties :—

Capt. J. Shirley, A.V.C., killed, November 27th.
Capt. R. E. Leach, A.V.C., died of wounds, November 29th.
Capt. C. Tracey, A.V.C., and Capt. J. S. Keane, A.V.C., each of whom has been wounded.

Both of these officers held temporary commissions and volunteered at the call of duty and in response to the urgent appeals of the War Office Authorities.

Capt. Shirley was in private practice at Bedale, in Yorkshire, and is the son of the late Mr. Shirley, M.R.C.V.S., of Twickenham, whilst Capt. R. E. Leach was the eldest son of Mr. E. Leach, M.R.C.V.S., the well-known and popular veterinary surgeon of Newmarket.

Capt. Tracey came from Ballinasloe, in Ireland; whilst Capt. J. S. Keane was a recent graduate (1916) of Glasgow College.

Capt. Leishmann, A.V.C., has had the misfortune to fracture one of his legs, and is in hospital.

Truly the end of November has brought bad luck to the Veterinary Service in France, these casualties happening, as they have done, just at a time when more officers are being asked for than can be obtained.

Obituary.

THE LATE CAPTAIN A. W. CAMPBELL, WISHAW.

THE veterinary profession will learn with regret of the death from wounds of this promising young officer, who was the only son of Mr. Archibald Campbell, M.R.C.V.S., Wishaw. Educated at Wishaw High School and Hamilton Academy, Captain Campbell entered the Veterinary College, Glasgow, and no sooner had he successfully sat his final examination two years ago than he joined the Army, being granted a commission in the Veterinary Corps. After six weeks' training at Aldershot he sailed for Egypt, going out as officer in command of a veterinary section. Two months after he had landed in the East he was given the post of O.C. of a mobile veterinary section, and for a year and five months was attached to the first line of defence in Salonica. While there in January he was promoted to the rank of captain. Subsequently, at his own request, he was given a change of duties. He was sent with the mobile section, in July, to Palestine, where he was posted to the Mounted Brigade, attached to headquarters,

and latterly was made a Brigade officer. He sustained a gunshot wound in the head in action on November 28th, and died in hospital on December 13th. Captain Campbell had a distinguished college career, and was one of the most brilliant students who have graduated from the Glasgow Veterinary College. He gained no fewer than seven medals and nine first-class certificates, and passed his final examination for the diploma of the Royal College of Veterinary Surgeons with honours.

SALVATORE BALDASSARE.

PROFESSOR BALDASSARE, who died recently, was in his 64th year, and was Director of the Veterinary School at Naples. Born at Foggia in 1853, he spent his early years in educational work, and eventually became assistant to Van Orstin, Director of the Zoological School at Portici. From there he went to Parma, where he was made Professor, and from thence he was called to Turin. Here, with Professors Bossi and Brasaco, he founded that standard work "Il Moderno Zoojatro." For some sixteen months he was engaged in the Argentine Republic, and after his return he became Director of the Veterinary School at Naples, which position he occupied until his death. On zoological points his name was always accepted as a very high authority, and his opinions will be much missed in that branch of science.

CARR, BEY.

WE regret to announce the death of El Miralai F. U. Carr, Bey, Principal Veterinary Officer Egyptian Army, and Director Veterinary Department Sudan Government, which took place in London on Saturday, the 10th ult.

The late Lieut.-Colonel Frederick Ulysses Carr received his commission as lieutenant in the Army Veterinary Department early in 1895. He served on the North Western Frontier of India on the Mohmand and Tirah Expeditions in 1897-98, receiving the medal with two clasps.

He served throughout the South African War, in which he was severely wounded, and promoted Veterinary-Captain. Among other operations he was present at Sanna's Post and received the Queen's medal with six clasps and the King's medal with two clasps.

Towards the end of the operations in South Africa he was attached to the staff of the Remount Commission, presided over by Lord Downe, and visited South Africa, Australia, and New Zealand with this Commission.

From 1903 to 1906 he was employed with the West African Frontier Force in Northern Nigeria, receiving the medal with clasp.

He was seconded to the Egyptian Army in September, 1908, and received the Sudan medal with clasp for the operations in Southern Kordofan in 1910.

At the outbreak of the European War in August, 1914, Lieut.-Colonel Carr proceeded to France with the First Division, taking part in the retreat from Mons, and the battles of the Marne and the Aisne. He was recalled to the Sudan in October, 1914.

While serving with the Egyptian Army he was granted the 4th Class Order of the Osmania and the 3rd Class Order of the Nile, and was mentioned in despatches in connection with the operations in Darfur, 1916.

It was in his capacity as Director of the Veterinary Department Sudan Government that Lieut.-Colonel Carr was perhaps best known in the Sudan, and as such he was responsible for the export trade in livestock. The expansion of this trade during the last few years—from a value of about £E.40,000 in 1908, to that of £E.380,000 in 1915—is one of the most remarkable facts in the economic history of the Sudan to date, and it is no exaggeration to say that it was almost entirely due to the late Lieut.-Colonel Carr's personal efforts and influence. He possessed in a remarkable degree the power of inspiring affection and loyalty in his subordinates, and his death at the early age of 45 years is a distinct loss to the administration of the Sudan. —*The Sudan Times.*

MR. WAN EMMS, Ditton House, Ilminster, Somerset, recently died at the age of 92. It is believed that he was the oldest living member of the R.C.V.S.

NOTICES.

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Veterinary Journal, Jan., 1914, *p.* 5.

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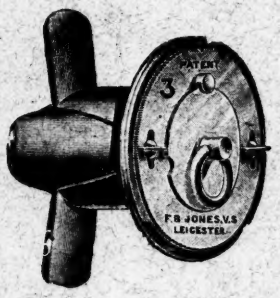

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